

## CLAIMS

1. A receiving apparatus that receives modulated signals transmitted from a transmitting apparatus that 5 transmits different modulated signals from a plurality of antennas, said receiving apparatus comprising:
  - a channel fluctuation estimation section that finds a channel estimate of each modulated signal;
  - a partial bit demodulation section that demodulates 10 only some bits of said modulated signal using a detection method different from likelihood detection;
  - a signal point reduction section that reduces candidate signal points using demodulated partial bits and said channel estimate; and
  - 15 a likelihood detection section that performs likelihood detection using reduced said candidate signal points and a received baseband signal.
2. The receiving apparatus according to claim 1, 20 further comprising a control section that controls which modulated signals' partial bits are used for candidate signal point reduction by said signal point reduction section based on reception quality of each modulated signal.

25

3. The receiving apparatus according to claim 1, further comprising a control section that controls how

many partial bits of each modulated signal are used for candidate signal point reduction by said signal point reduction section based on reception quality of each modulated signal.

5

4. The receiving apparatus according to claim 1, wherein said partial bit demodulation section comprises:

a separation section that separates a received signal into modulated signals; and

10 a partial bit determination section that finds a candidate signal point for which a Euclidian distance from the separated modulated signal reception point is a minimum, inverts bits contained in a bit string corresponding to the found candidate signal point one at a time, searches, for each inverted bit, for a plurality of candidate signal points containing the inverted bit, detects, for each inverted bit, a minimum Euclidian distance between a reception point and said plurality of candidate signal points, detects a maximum Euclidian 15 distance among minimum Euclidian distances of said each inverted bit, and determines 1 bit corresponding to the detected maximum Euclidian distance to be said 20 distance among minimum Euclidian distances of said each inverted bit, and determines 1 bit corresponding to the detected maximum Euclidian distance to be said demodulation partial bit.

25 5. The receiving apparatus according to claim 1, wherein said partial bit demodulation section comprises:

a separation section that separates modulated

signals by performing inverse matrix computation on a channel estimation matrix using said channel estimate; and

5 a partial bit determination section that determines partial bits of the separated modulated signal.

6. The receiving apparatus according to claim 1, wherein said partial bit demodulation section comprises: a separation section that separates modulated 10 signals by performing MMSE (Minimum Mean Square Error) computation; and

a partial bit determination section that determines partial bits of a separated modulated signal.

15 7. A partial bit determination method comprising: a minimum distance candidate point detecting step of detecting a candidate signal point for which a Euclidian distance from a modulated signal reception point is a minimum;

20 an inverting step of inverting bits contained in a bit string corresponding to a detected candidate signal point one at a time;

25 a step of searching, for each inverted bit, for a plurality of candidate signal points containing an inverted bit;

a step of detecting, for each inverted bit, a minimum Euclidian distance between a reception point and said

found plurality of candidate signal points;  
a step of detecting a maximum Euclidian distance  
among minimum Euclidian distances of said each inverted  
bit; and

5 a step of determining a bit corresponding to a  
detected maximum Euclidian distance to be a partial bit.

8. A transmitting apparatus that transmits different  
modulated signals from a plurality of antennas, said  
10 transmitting apparatus comprising:

a modulation section that obtains a modulated signal  
by performing signal point mapping of transmit bits using  
a signal point arrangement that is divided into a plurality  
of signal point sets on an IQ plane, and whereby a minimum  
15 distance between signal points within a signal point set  
is smaller than a minimum signal point distance between  
signal point sets; and

an antenna that transmits a modulated signal  
obtained by said modulation section.

20

9. The transmitting apparatus according to claim 8,  
further comprising a coding section that codes transmit  
bits mapped within a same signal point set together.

25 10. The transmitting apparatus according to claim 9,  
wherein said coding section executes coding with higher  
error correction capability for transmit bits mapped

within said same signal point set than for other transmit bits.